nearest approach to the earth in the middle of September it exhibited a tail $2\frac{1}{4}$° in length, according to Baron de Zach; at this period, though near perihelion, its distance from the earth was 1·26. We may conclude that should the comet arrive at its least distance from the sun about the close of the year, its recovery will be almost certain.

In a future note we shall examine the conditions attending perihelion passage at other seasons.

The appearance immediately preceding that of 1812 probably occurred about the year 1742. The calculated comet of that year had very different elements, and the same remark applies to the two comets of 1743. Struyck mentions a second comet in 1742, recorded in the journals of several Dutch navigators. On the morning of April 14, the ship being (at noon) in latitude 35° 36′ S., and longitude 42° E., the comet was in the E. $\frac{1}{4}$ S.E., with a tail 30° in length; the time is not given. From this rough indication it may perhaps be inferred that its place was somewhere amongst the stars of Pisces, or bordering ones in Aries; in too small a right ascension to admit of its identity with the comet of 1812. And as already stated, an examination of earlier cometary records is not attended with more success.

During the actual revolution there may be very sensible perturbations due to the attraction of the planet Uranus.

THE ZODIACAL LIGHT.—This phenomenon was conspicuous in the neighbourhood of London on the evening of the 4th inst. At 6h. 35m. the light was very much stronger than that of the Via Lactea in the brightest part above the horizon, and totally different in colour, being a pale yellow in the more elevated portion, with a ruddy tinge nearer the horizon. It was not distinctly traceable much beyond ζ Piscium; the axis of the light passed through about R.A. 352°, N.P.D. 100°.

BIOLOGICAL NOTES

AMOUNT OF WATER IN TREES.—Farmers and gardeners have often observed, and the fact is referred to by Lindley, that during cold weather the branches of certain trees are sometimes so much bent down as to obstruct passage below the tree, but that with the advent of mild weather they return to their former positions. In investigating these phenomena, Prof. Geleznow observed that they depend not only upon temperature, but also upon the humidity of the air; and he undertook, therefore, a series of researches to ascertain the amount of water contained in different parts of the branches under various atmospheric conditions. The first part of these researches (not yet published) proved (1) that the amount of water increases in each branch from its base to its summit; (2) that the bark of the larch throughout the year contains more water than the wood; and (3) that in Coniferæ the upper part, *i e.*, the part above the pith of a horizontal branch, contains always more water than the lower part, whilst in other trees, as, for instance, the birch, the conditions are reversed; altogether, that Coniferæ and Dicotyledones seem to possess opposite properties, as regards the distribution of water in the tree. Further researches, published now in full (*Bull. Ac. de St Pétersb.*, vol. xxii., No. 3), introduced new elements into the inquiry, namely, the varying amount of water in the bark and the wood. It appears from these researches that humidity of the wood and dryness of bark have a constant relation; that in certain trees (fir and maple) the wood remains throughout the year drier than the bark, while in others (birch and aspen) this is the case only during a part of the year, the conditions being reversed at other times. The relations between the humidity of the bark and that of the wood are so constant, that a useful classification could be based on them. It appears, further, that the smallest amount of water contained by the branches of certain trees, as, for instance, the fir, is observed during the season when the vegetation is in fullest vigour, and that this circumstance, as well as some other important facts, is in close relation with the development of leaves. Altogether the researches, which are yet far from being completed, promise to disclose, and probably explain, a variety of very interesting facts.

THE EEL.—In the last session of the Rhenish and Westphalian Natural History Society, O. Melsheimer reported the results of observations on the habits of the eel, conducted through a series of years. The statement that the eel subsists on vegetable nourishment, probably originating from Albertus Magnus, is shown to be utterly false. Examinations of the contents of the stomach of numerous individuals show that the food of the eel is exclusively animal. It seems to be especially fond of the river lamprey (*Petromyzon fluviatilis*). The periodical movements—down stream in August and September, and up stream in April—are brought in connection with the spawning, which takes place in the sea. The bluish-black and the yellowish-green varieties are perfectly alike in their habits.

HONEYDEW IN PLANTS.—Prof. Dr. H. Hoffmann, of Giessen, has recently published the results of his observations on the formation of honeydew upon the leaves of plants, and has come to the conclusion that it is not to be attributed to the *Aphis*, or other insects. A healthy specimen of *Camellia japonica*, $1\frac{1}{2}$ feet in height, without blossoms, which afforded an instance of the phenomenon, was found to be entirely free from insects. The so-called honeydew consisted of a sticky colourless liquid, which possessed a sweetish taste, and contained, principally, gum. This gradually appeared on the surface of the leaves, slowly forming drops on the under-side, which dropped down to be continually replaced. The separation of the liquid continued vigorously for some time, even after the removal of the leaves from the plant. Although showing that the appearance of the dew is not attributable to insects, Prof. Hoffmann was unable to ascertain the real method of formation. On the upper side he was able to trace the origin of spots of a clear slightly sweet liquid on the leaves of an ivy, to the presence of *Coccus sp.* This insect, as well as *Coccus abietis* and *pini*, seems to possess the power of forcibly ejecting, *per anum*, a sweetish secretion, which causes them to be sought after by bees.

RELATION OF BODY-CHANGE TO TEMPERATURE.—From exact experiments on frogs (measuring the consumption of oxygen and production of carbonic acid at different temperatures), M. Schulz arrives at the conclusion that the exchange of materials in these animals is directly dependent on the temperature (Pflüger's *Archiv*). It is specially notable, in M. Schulz's tables, that at 1° body-temperature the frog exhales so little carbonic acid that it was hardly certain whether it produced any (the amount was 0·0084 gr. per kilo. and hour). At 33° to 35°, on the other hand, the frog shows an exchange of material which comes up to that of man, and at 37° it would probably exceed this considerably, if the organism of the cold-blooded animal permitted of so rapid a replacement as the strong consumption would require. The upper limit of temperature for the frog is therefore somewhere about 35° C.

NOTES

THE city of Brunswick is making preparations to celebrate the 100th birthday of Carl Friedrich Gauss, the mathematician and astronomer, who was born there April 30, 1777. A statue is to be erected to Gauss, and it is hoped that the foundation stone will be laid on the celebration day. Contributions are requested by the Committee to be sent to the Brunswick Bank.

From a circular recently issued by the general committee intrusted with the duty of collecting subscriptions for the erection of a statue to Liebig, it appears that the sum total contributed up to January 1, 1877, amounts to over 7,000*l.*, after the deduction of necessary expenses. Russia contributed over one-half of the receipts acknowledged in this third and last report. Since the decision to provide Giessen as well as Munich with a statue, the authorities of the former place have selected a fitting locality for the memorial, and laid it out in a tasteful manner.

We greatly regret to hear of the death of Capt. J. E. Davis, in his sixty-first year. Capt. Davis had only recently retired from the Hydrographical Department, to which he had rendered important services. He was also well known as an authority on polar matters, having himself seen service in the Antarctic regions. Capt. Davis had much to do in connection with the fitting out of the *Challenger* Expedition, and had himself made important contributions to hydrography.

Letters from Athens report the death of Prof. J. Papadakis, the Rector of the University, after a long period of suffering. He occupied the chair of mathematics and astronomy during a long series of years, and was a leading spirit not only in scientific circles, but also in the general society of Athens.

The question of the erection of a great polytechnic school in Berlin is to be brought before the German Parliament. The estimated cost is eleven million marks.

The philosophical faculty of Zürich University has conferred the degree of Doctor in Philosophy on a lady.

In our notice last week of "Two *Challenger* Books," it was inadvertently implied that Lord George Campbell's "Log Letters from the *Challenger*," did not contain a map. That work has a map and an excellent one, taken, in fact, from the *Proceedings* of the Royal Society. Not only does it show the course of the ship, but the depths and dates of the various soundings, and by means of different colours, the varied deposits found on the ocean bed. The map adds greatly to the scientific value of the work.

M. Becquerel will take for the subject ot his lectures at the Paris Museum, Light and its Effects. The course of lectures will begin after Easter, and include the subject of the radiometer. Neither of the two Becquerels, for M. Leon Becquerel is his father's assistant, has ever given his opinion on the radiometer, and their joint verdict is expected with not a little curiosity.

Nine Lectures on the Osteology of Birds will be delivered in the theatre of the Royal College of Surgeons, on Mondays, Wednesdays, and Fridays, at 4 p.m., commencing on Friday, February 16, 1877, by Prof. W. K. Parker, F.R.S.

A new mercury rheostat, which Jacobi devised shortly before his death, is described by M. Chwolson (*Bull. Ac. de St. Pétersb.*, vol. xxii. p. 409), and its advantages and disadvantages are thoroughly discussed and illustrated by the results of some measurements. Owing to the very great precision of the new instrument, it appears to be especially useful for the measurement of very small resistances. The author concludes that this rheostat leaves far behind all former ones, and that the instrument itself, or at least its principles, will probably play an important part in future galvanometric researches.

The Smith's prizes, Cambridge, have been adjudged as follows :—First prize, Donald MacAlister, B.A., St. John's College; second prize divided between Richard Charles Rowe, B.A., of Trinity, and James Parker Smith, B.A., of Trinity. Mr. MacAlister was senior wrangler, and Mr. Rowe and Mr. J. P. Smith third and fourth wranglers in this year's tripos.

At a meeting of the Council of the Yorkshire College of Science, held February 2, it was resolved, "That the question of an extension of the curriculum in the direction of literature is now ripe for action on the part of the College," and a committee was appointed to confer with a delegation from the University Extension Committee, in order that a scheme might be brought before the Board of Governors. This is a step in the right direction.

The United States Government have awarded Capt. Allen 800 dollars, and Capts. Adams, Soutar, and Walker, 300 dollars, for their kindness to the crew of the Arctic ship *Polaris*.

The *Journal* of the Anthropological Institute will in future appear on the 1st of February, May, August, and November.

There will be an examination at King's College, Cambridge, on April 4 and following days, for an exhibition in natural science. The exhibition is worth about 90*l.* a year, tenable for three years, but not with any other exhibition or any scholarship of the college. Candidates must be under twenty years of age, unless already members of the college. The examination will be in physics, chemistry, and either comparative anatomy or botany, in addition to elementary classical and mathematical papers. Candidates must give a fortnight's notice of their intention to compete, sending in to the tutor certificates of character, and naming the particular subjects in which they wish to be examined.

The following College Lectures in the Natural Sciences will be given at Cambridge during Lent Term :—Gonville and Caius College: "On the Physiology of Digestion, Absorption, and Sanguification," by Dr. Bradbury; "On Non-metallic Elements," by Mr. Apjohn. Christ's College: "On Vegetable Histology," by Mr. Vines. St. John's College: "On Chemistry," by Mr. Main; instruction in Practical Chemistry will also be given; "On Physical Geology," by Mr. Bonney; "On Palæontology," by Mr. Bonney; in the course of the term some demonstrations in Microscopic Lithology will be given; elementary course in Geology postponed to next term. Trinity College: "On Electricity," by Mr. Trotter; "Elementary Physics," by Mr. Trotter; "An Elementary Course of Practical Morphology," by Mr. Balfour; "Practical Physiology and Histology," by the Trinity Prælector in Physiology (Dr. Michael Foster), at the New Museums. Sidney Sussex College: "On Vegetable Histology and Physiology," by Mr. Hicks. Downing College: "On Chemistry," by Mr. Lewis; "On Comparative Anatomy and Physiology," by Mr. Saunders.

The Bessemer Medal of the Iron and Steel Institute has been awarded to Dr. Percy, F.R.S.

The King of Greece has conferred upon Mr. Edward Stanford the knighthood of the Royal Order of the Saviour for the services rendered by him to geographical science.

A Bill has been proposed to the U.S. Congress for the equipment of several Arctic expeditions.

The sad news has been received from the African West Coast, that Baron Barth committed suicide, under an attack of fever, at Loanda, on December 7, 1876, and Dr. Mohr died at Malange on November 26, 1876, where he had only recently arrived. Baron Barth was making a botanical and geological survey of Portuguese Africa on account of the Portuguese government. Dr. Mohr will be known to our readers as the author of an interesting narrative of his journey to the Victoria Falls of the Zambesi; he was sent out by the German African Society to carry on the work of exploration from the Portuguese colony from which so many German explorers have had to return.

A French expedition under MM. Brazza and Marche is exploring the Ogowe, a large stream to the north of the Congo. News has been received by the Geographical Society of Paris from these explorers, said to be important, and will be made public at the next sitting.

The recent discussion of the budget in the Belgian House of Representatives brought out some interesting information as to the state of primary instruction in the country. The general yearly expenses of the State for educational purposes being, in the average of many years, about 480,000*l.* (6 per cent. of the whole of the budget), from two-fifths to one-half of this sum was devoted to primary instruction. The ordinary allotments of the State for this subject were, during the years 1872 to 1876, from 188,000*l.* to 244,000*l.*; but the part taken by the communes in primary instruction is very limited. When compared for instance, with Germany, the share of these expenses which falls on the State, is as much as about 38 per cent. of the whole of the expenses of the country. The number of normal schools for primary instruction was thirty-nine, for a population of 5,250,000 souls, *i.e.*, one normal school for every 141,970 inhabitants. But the instruction, and yet more the inspection, remain still mostly in the hands of the Catholic clergy, and the general results of the efforts made by the State, though showing some improvement during the last ten years, are by no means satisfactory. Steps are being taken to introduce the teaching of natural science into primary schools. Thus, M. Couvreur ably advocated in the House the foundation of a central and some local pedagogical museums, on the plan of that of St. Petersburg, which museums would be permanent exhibitions of recent improvements made in Europe and America in the elementary teaching of natural science; he also recommended institutions where the value of the various methods and apparatus could be submitted to experiment and discussion. Such a museum is to be opened before long by the city of Brussels. The Ministry also recommends to teachers to give to their scholars some elementary notions in natural science, applied to agriculture.

The first number of Petermann's *Mittheilungen* for 1877 contains several papers of much value. There is the first instalment of a paper on the ethnology of Russia, in which this question is gone into with the usual thoroughness, accuracy, and detail of this journal; it is accompanied by a carefully-constructed map, embracing the whole of Russia in Europe and Asia, as well as some of the neighbouring territories. Dr. Loesche describes the results of a journey by himself and Dr. Falkenstein, in 1875, up the Killoo or Kuilu river, in Loango; he gives some important notes on the natural history of the district. E. Tessier gives a *résumé* of M. J. Dupuis' travels in South China, and Dr. A. Mühry discusses the geographical conditions of some European storms. In a short paper we are informed that Clemens Denhardt has been making preparations for some time for an exploring expedition into Central Africa, the particular region which he intends to occupy being that bounded by the Indian Ocean, the east and south of the Abyssinian Mountains, the Nile and its tributaries, the great lakes, Kilimanjaro and the River Dana—a region still almost entirely unknown. A feature of great interest and the highest importance has been commenced in this number, viz., a monthly summary of geographical work in the various regions of the globe, by Dr. Behm. The first instalment embraces the last three months of 1876, and its regular continuance will make the *Mittheilungen* almost all that could be desired as a geographical journal.

M. Fouqué has been appointed professor to the College of France, in room of the late M. Charles St. Claire-Deville, whose pupil and assistant he was.

At the next meeting of the Society of Telegraph Engineers, to be held on the evening of Wednesday the 14th inst., Mr. W. H. Preece will read a paper on "Shunts and their Applications to Electrometric and Telegraphic Purposes."

We have received the first number of a new monthly popular Norwegian scientific journal named after our own, *Naturen*. The editor is Hans H. Reusch, and among the list of contributors is the well-known name of Prof. Sars.

Prof. de Bary, of Strassburg, has declined the offer of the Botanical Chair in Tübingen rendered vacant by the death of Prof. Hofmeister.

Dr. Henry Muirhead, of Cambuslang, has offered to the University of Glasgow the sum of 2,100*l.* as an endowment for a Demonstrator of Physiology in connection with the Chair of the Institutes of Medicine. The object of the endowment is the promotion of medical science by the training of young men of suitable capacity to become teachers and investigators of physiology, and as this training is best attained by actual work in the laboratory and by practical experience in the art of teaching, the demonstrator will be regarded as a teaching assistant to the professor, while he will also be encouraged to pursue independent original investigation, and will be aided by the use of all the laboratory appliances.

The third edition of "L'Homme Fossile en Europe," by the late H. Le Hon, being out of print, a fourth edition, just appeared in Brussels, will be the more welcomed as it contains, besides a short biography of the author, numerous additions by M. Ed. Dupont, referring to the recent discoveries in this department, and bringing this most valuable work to the present level of our knowledge as to the origin of man.

We are glad to see that a second edition of Dr. Frank Clowes's "Elementary Treatise on Practical Chemistry" (J. and A. Churchill) has been published, with some useful additions. We noticed the first edition in vol. xi. p. 107.

In the *South Australian Register*, of November 28, 1876, is an interesting lecture by the Rev. S. J. Whitmee, on the Ethnology and Philology of Polynesia. He contends that over all Polynesia there are two distinct types of people, a brown race connected with the Malays, and a black, or negro race, connected with the Papuans. There is also a third and very much mixed race, to which Mr. Whitmee could not venture to give a name or assign an origin.

We have received a separate reprint from the *Philosophical Magazine*, of Capt. Abney's paper "On the Alkaline Development of the Photographic Image."

Prof. Dieterici, of Berlin, sought to show in a public lecture, delivered a few days since, that the theories of Darwin were by no means novel, having been essentially published by learned Arabs in the tenth century.

We have received several numbers of the *Bulletin* of the Torrey Botanical Club of New York, containing interesting papers which relate chiefly to botanical subjects of local interest.

The additions to the Zoological Society's Gardens during the past week include a Pig-tailed Monkey (*Macacus nemestrinus*) from Java, presented by Dr. Broadbent; a Brazilian Tree Porcupine (*Cercolabes prehensilis*) from Trinidad, presented by Mr. Eliot S. Currey; three Amherst Pheasants (*Thaumalea amherstiæ*) from China, presented by Dr. A. P. Reid; a Yellow-fronted Amazon (*Chrysotis ochrocephala*) from U. S. Columbia, presented by Mr. F. A. B. Geneste; three Rhomb-marked Snakes (*Psammophylax rhombeatus*) from South Africa, presented by the Rev. P. H. R. Fisk; an Ocelot (*Felis pardalis*) from South America, three Andrean Geese (*Bernicla melanoptera*) from Peru, purchased; two Double-striped Thicknees (*Œdicnemus bistriatus*) from Central America, purchased.